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Two newly recorded species of the genus *Herpetogramma* (Lepidoptera: Crambidae: Spilomelinae) in KoreaBo-Sun Park^a, Mu-Jie Qi^b, Sol-Moon Na^a, Dong-Jun Lee^a, Jae-Won Kim^a, Yang-Seop Bae^{a,c,*}^a Division of Life Science, Incheon National University, Incheon, South Korea^b College of Life Sciences, Nankai University, Tianjin, China^c Bio-Resource and Environmental Center, College of Life Sciences and Bioengineering, Incheon National University, Incheon, South Korea

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ABSTRACT

Two species of the genus *Herpetogramma* Lederer are reported for the first time in Korea: *Herpetogramma licarsialis* (Walker) and *Herpetogramma stultalis* (Walker). The description, host plants, adult photographs, and pictures of the male and female genitalia are provided.

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Introduction

The genus *Herpetogramma* (Spilomelinae) was established by Lederer in 1863, with the type species: *Herpetogramma servalis* Lederer, 1863 from Brazil. To date, 100 species have been recorded in the world (Nuss et al 2003–2015). The larvae of *Herpetogramma stultalis* are a pest of *Achyranthes aspera* (Akhilesh and Sebastian 2014). In addition, *Herpetogramma licarsialis* is an important pest of turf and other grass crops in Hawaii, Australasia, and Southeast Asia (Tofangsazi et al 2014), and it is widely distributed in India, Ceylon, Malacca, China, Japan, Java, Borneo, the Marshall Islands, Fiji, Samoa, the Society Islands, the Austral Islands, and Australia (Davis 1969).

To date, 6 species have been reported in Korea: *Herpetogramma fuscescens* (Warren, 1892); *Herpetogramma luctuosalis* Leech, 1889; *Herpetogramma magna* (Butler, 1897); *Herpetogramma moderatalis* (Christoph, 1881); *Herpetogramma phaeopteralis* (Guenée, 1854); and *Herpetogramma rudis* (Warren, 1892) by Bae et al (2008).

Herpetogramma cynaralis Walker was recently recorded by Kim et al (2012) and *Herpetogramma ochrimaculale* (South) was newly recorded by Roh et al (2014). To date, eight species have been reported in Korea. In the present study, we report an additional two species in the genus *Herpetogramma*: *H. licarsialis* (Walker, 1859) and *H. stultalis* (Walker, 1859).

Materials and methods

Materials examined in the present study are preserved in the Biodiversity Laboratory of the Incheon National University (INU) in Incheon, Korea. The genitalia were dissected and examined under a Leica EZ4 stereomicroscope (Leica S8APO, Taiwan). Pictures of the adults were obtained by a digital camera (Cannon EOS 50D, Japan) and genitalia pictures were obtained by a stereomicroscope (Leica S8APO, Taiwan).

Systematic accounts

Order Lepidoptera Linnaeus, 1758.

Family Crambidae Latreille, 1810.

Subfamily Spilomelinae Guenée, 1854.

Genus *Herpetogramma* Lederer, 1863.

Type species: *Herpetogramma servalis* Lederer, 1863.

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Herpetogramma Lederer, 1863: 430. TS: *Herpetogramma servalis* Lederer.

Pachyzancla Meyrick, 1884: 315. TS: *Botys mutualis* Zeller.

Acharana Moore, [1885]: 285. TS: *Botys otreusalis* Walker.

Stenomeres Warren, 1892: 437. TS: *Botys agavealis* Walker.

Piloptyla Swinhoe, 1894: 142. TS: *Piloptyla nigricornalis* Swinhoe.

Pantoeocome Warren, 1896: 173. TS: *Pantoeocome deformis* Warren.

Macrobotys Munroe, 1950: 228. TS: *Botys aeglealis* Walker.

Coremataria Amsel, 1956: 207. TS: *Botys infuscalis* Guenée.

***Herpetogramma licarsisalis* (Walker, 1859)**

(Figures 1, 2 and 3)

Botys licarsisalis Walker, 1859: 686. TL: Borneo.

Botys pharaxalis Walker, 1859: 727. TL: Australia.

Botys immundalis Walker, [1866]: 1448. TL: Java.

Entephria fumidalis Walker, [1866]: 1486. TL: Australia.

Botys serotinalis Joannis, 1888: 272. TL: Syrie.

Adult (Figure 1). Wingspan 19–21 mm. Head ochreous; frons ochreous mixed with dark brown on dorsal area; vertex with erect brownish scales; antenna reaching about 1/2 of forewing, ciliate, with scape and pedicel dark brown; ocellus well-developed, fuscous. Labial palpus with basal 1st segment whitish gray, 2nd and 3rd segments large with fuscous scales. Proboscis long, yellowish white scales at base. Patagium ochreous. Tegula whitish ochreous. Thorax whitish ochreous. Legs long, yellowish white; tibial spur 0-2-4; hindlegs with mid inner spur 3 times as long as outer one; hind inner spur 3 times same length as outer one. Abdomen fuscous, whitish brown at edge of posterior portion of each segment. Forewing with ground color fuscous yellow, terminal area dark, markings indistinct, postmedial line dentated with dark brown; discal area with blackish pattern, antemedial line dark brown and dentated; fringe whitish-brown. Hindwing weakly patterned with dark brownish postmedial line, terminal area darker, basal and medial area pale; fringe whitish brown.

Male genitalia (Figures 2A and 2B). Tegumen well-developed. Saccus triangular, slender at apex. Uncus long and slender, pointed at apex with numerous hairs. Valva rounded at apex, costa sclerotized about 1/2 length of valva; harp long and straight, paralleled with sacculus. Sacculus sclerotized, extended to half of outer margin; aedeagus long and slender, straight with 2 cornuti consisting of several spines; one rod-shaped with bundle of spinula at basal part, the other one bush-shaped at apex of aedeagus.

Female genitalia (Figures 3A and 3B). Papilla analis well-developed, slightly sclerotized, elliptical with numerous hairs. Apophysis anterioris about 2 times as long as posterioris. Ostium bursae



Figure 1. Adult specimen. 1, *Herpetogramma licarsisalis* (Walker, 1859), female.



Figure 2. A, The male genitalia of *Herpetogramma licarsisalis* (Walker, 1859); B, The aedeagus.

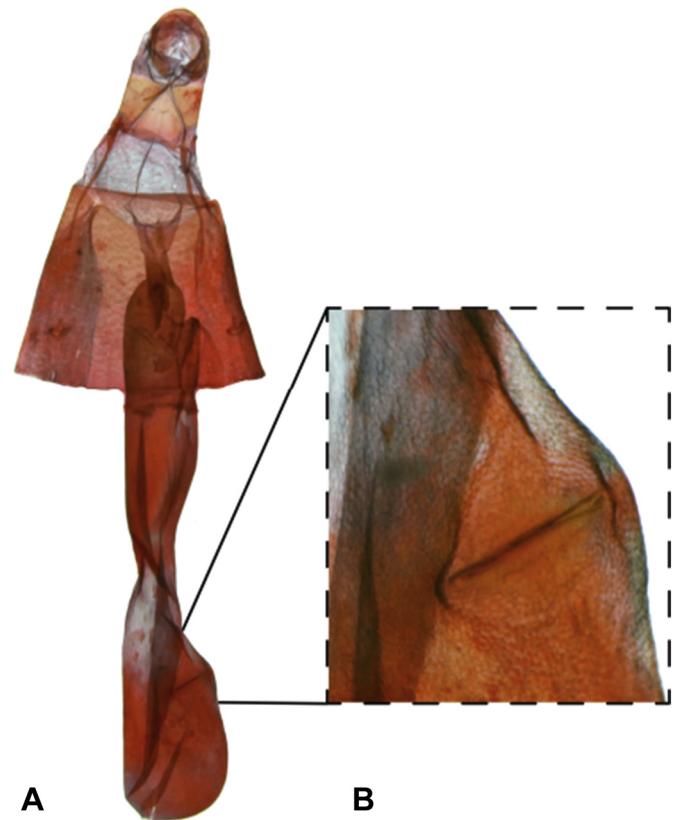


Figure 3. A, The female genitalia of *Herpetogramma licarsisalis* (Walker, 1859); B, The signum.

moderate, membranous. Ductus bursae membranous, long and enlarged. Ductus seminalis originating from posterior part of ductus bursae. Corpus bursae membranous, bulb-shaped with one elongated signum; corbus bursae about 2/3 length of ductus bursae.

Material examined. 1 male, Shiheung-shi, Kyeonggi Province, 24 August 1996 (MK Paek), gen. slide no. UIK-3544; 1 female, Youngyu Island, Incheon City, 28 August 1997 (MK Paek and NH Ahn), gen. slide no. UIK-3543; 1 female, Jangbong-do Island, Ongjin-gun, Kyeonggi, 11 October 2003 (Bae et al), gen. slide no. UIK-3548.

Distribution. Korea (new record), China, Japan, Democratic Republic of the Congo, Egypt, Ethiopia, La Réunion, Madagascar, Sierra Leone, South Africa, Sudan, Togo, Zimbabwe, British isles, Australia, Cyprus, Portugal, United Kingdom, and Borneo.

Host plants. Unknown in Korea. Gramineae (*Cynodon*, *Echinochloa hispidula*, *Ischaemum*, *Oryza sativa*, *Panicum*, *Paspalum*, *Penisetum*, *Sorghum*, *Zea mays*), Acanthaceae (*Acanthus ebracteatus*), Marattiaceae (*Angiopteris evecta*), Amaranthaceae (*Gomphrena globosa*), Sapindaceae (*Nephelium lappaceum*), Leguminosae (*Senna siamea*) (Robinson et al 2010).

Remarks. This species is similar in both sexes, but the male antenna is short, and the color of wing is darker than that of the female.

Herpetogramma stultalis (Walker, 1859)

(Figures 4 and 5)

Botys stultalis Walker, 1859: 669. TL: Sri Lanka.

Botys basistrigalis Walker, [1866]: 1443. TL: Java.

Botys retractalis Walker, [1866]: 1447. TL: Java.

Adult (Figure 4). Wingspan 18–22 mm. Head whitish ochreous; frons fuscous; vertex with erect whitish ochreous scales; antenna reaching about 1/3 of forewing, ciliate, with scape and pedicel dark brown; ocellus well-developed, fuscous. Labial palpus basal the 1st segment whitish, the 2nd segment broad with fuscous, the 3rd segment short, small with fuscous. Proboscis with yellowish white scales at base. Patagium and tegula whitish ochreous. Thorax whitish ochreous. Legs long, yellowish white, tibial spur 0–2–4; midlegs with mid inner spur 1.3 times as long as outer one, hindlegs with each inner spur 1.3 times as long as outer one. Abdomen fuscous, whitish brown at edge of posterior portion of each segment. Forewing with ground color yellowish-ochreous, distinct patterned, terminal area more fuscous, dark fuscous postmedial line; discal area with fuscous pattern and fuscous orbicular spot, antemedial line straight, fuscous; fringe fuscous. Hindwing distinct patterned, postmedial line fuscous, terminal area more fuscous, basal and medial areas yellowish-ochreous with fuscous discal spot; fringe fuscous.

Female genitalia (Figures 5A and 5B). Papilla analis well-developed, slightly sclerotized, elliptical with numerous hairs. Apophysis anterioris about 2 times as long as posterioris. Ostium membranous. Ductus bursae short and slender, well-sclerotized. Copus

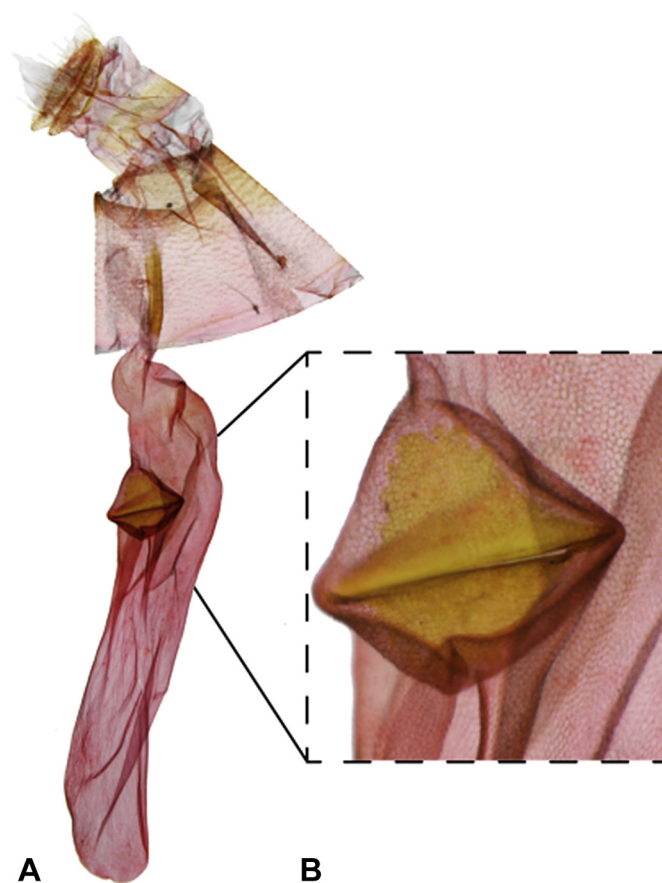


Figure 5. A, The female genitalia of *Herpetogramma stultalis* (Walker, 1859); B, The signum.

bursae rather long, membranous. Signum rhomboidal, with sclerotized line at middle.

Material examined. 1 female, Shiheung-shi, Kyeonggi Province, 30 August 1996 (MK Paek), gen. slide no. UIK-3545.

Distribution. Korea (new record), Sri Lanka, China, Australia, Malaysia, India, Pakistan, Papua New Guinea, Congo, and La Réunion.

Host plants. Unknown in Korea. Amaranthaceae (*Achyranthes aspera*, *Alternanthera sessilis*), Acanthaceae (*Asystasia intrusa*, *Barleria strigosa*), Nyctaginaceae (*Boerhavia diffusa*), Leguminosae (*Glycine*) Labiatae (*Plectranthus incanus*, *Pogostemon cablin*), Solanaceae (*Solanum melongena*), Malvaceae (*Thespesia lampas*), and Lamiaceae (Robinson et al 2010).

Remarks. This species is similar to *H. rudis* (Warren) in the superficial appearance. However, it can be distinguished from the latter by its smaller size, short wingspan, thicker postmedial line, indistinct terminal line and distinct pattern.

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Figure 4. Adult specimen. *Herpetogramma stultalis* (Walker, 1859), female.

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